

PERFORMANCE EXPECTATIONS OF THE  
COMMUNICATIONS MANAGER

Leslie Scott Blankinship

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# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



# THESIS

Performance Expectations of the  
Communications Manager

by

Leslie Scott Blankinship  
Thomas Baird Holliday

September 1974

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20 (Cont'd)

curriculum graduates to have previous communications experience. The report summarizes the data obtained and recommends changes which could improve the Communications Managers' effectiveness.





Performance Expectations of the Communications Manager

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September 1974



## ABSTRACT

A survey of commands which have utilized the Communications Management (9310-P) Subspecialty code billet was conducted by a questionnaire. This was done in order to determine whether the education provided in the Information Systems (Telecommunications) Curriculum has been meeting the needs of the users of the curriculum graduates.

Results showed that the expectations of the operating commands polled closely parallels the educational objectives of the curriculum. Fifty-six percent however, indicated a strong desire for curriculum graduates to have previous communications experience.

The report summarizes the data obtained and recommends changes which could improve the Communications Managers' effectiveness.



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## I. INTRODUCTION

The United States Navy has long been aware of the importance of graduate education for its officers as a method of remaining abreast with the state of the art in all fields of endeavor. One result of the Navy's efforts to constantly keep up with the ever increasing complexities of its shipboard, aircraft, weapon, and communications systems was the evolution of various graduate management education programs. The so called "seat of the pants" manager was becoming ineffective, and the need for a well educated manager had been recognized.

In recent times, the Naval Communications System has become a vast network of intricate subsystems which provide for rapid and reliable transfer of intelligence. In order to help make this growing and changing system operate more efficiently, the Communications Manager has evolved.

### A. DEFINITIONS

In order to clarify the most essential terms used throughout the thesis, the following list of definitions is provided.

Subspecialty - An officer manpower classification category defined by an operational, technical, or managerial field of interest to the Navy which requires specialized professional skills and knowledge (obtained through various combinations of pertinent education, training, and/or experience.)

Subspecialty Code - A five-digit classification (four numeric and one alpha digits) which identifies a subspecialist area and level of expertise.



P-Code - Assigned to billets requiring incumbents with at least a master's level of education for optimum performance of duty.<sup>1</sup>

Communications Manager (9310-P) - The subspecialty code assigned to the graduates of the Naval Postgraduate School Information Systems (Telecommunications) Curriculum.

Educate - To develop the knowledge, skill, or character of, especially by formal schooling.

Train - To instruct so as to make proficient.<sup>2</sup>

## B. PURPOSE OF THE STUDY

The primary intent of this study is to examine the conceptions and opinions that have been formed about the graduates of the Naval Postgraduate School Information Systems (Telecommunications) Curriculum. The hypothesis is that a difference exists between the educational objectives of the curriculum and the performance level expected by the operational commanders who will utilize the Communications Manager.

The Communications Management (9310-P) Subspecialty was created in order to fulfill a need that existed within the Naval Telecommunications Community. It doesn't necessarily follow that identifying a need leads automatically to the determination of the best method of accommodating that need. At present, the Information Systems (Telecommunications) Curriculum offered at the Naval Postgraduate School is the primary means

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<sup>1</sup>OPNAV INSTRUCTION 1211.6D dated 6 January 1973.

<sup>2</sup>Educate and train definitions were taken from the Webster's New World Dictionary of the American Language, dated 1965.



by which the Navy can produce the Communications Management (9310-P) subspecialist. It is possible that the program may not be providing all the needed elements necessary for the curriculum graduate to perform successfully in a billet requiring a Communications Manager.

In order to evaluate the potential problem discussed in the foregoing, a survey of commands utilizing the Communications Management (9310-P) Subspecialist has been conducted. The data obtained will be used to evaluate the current system of providing these subspecialists via Naval Postgraduate School education.



## II. BACKGROUND

### A. ORIGIN AND DEVELOPMENT OF THE 620 CURRICULUM

The forerunner of today's Communications Manager attended a twenty week 'General Line Course in Communications'. The 1931-1932 U. S. Naval Academy Postgraduate School catalogue stated:

The purpose of this course is to familiarize the students with the organization and operation of the entire Naval Communication Service. Instruction and practical work in coding and decoding is given in all types of codes and ciphers used by the Navy. ....The handling of communications by both radio and visual means will be covered in detail. The form and procedure used are of prime importance in maintaining discipline and effecting prompt delivery of messages.

This first curriculum was purely a communications officer training course. No other was deemed necessary at the time.

Over the next thirty years the communications program developed through the Applied Communications, Command Communications, and Staff Communications Curricula to the present Information Systems (Telecommunications) Curriculum at the Naval Postgraduate School in Monterey. With each change in the curriculum designation, the emphasis has turned further away from training and more toward education. More electronics and general management courses were added to the curriculum in order to better prepare the graduate for communications billets.

Today, the eighteen month Information Systems (Telecommunications) 620 Curriculum is designed to:





Provide instruction to officers who will perform as Communications Managers of new communications systems applications or as Communications Officers in large commands and staffs, afloat and ashore, including the Joint Chiefs of Staff and the Defense Communications Agency.<sup>3</sup>

The above mentioned instruction includes:

A non-engineering approach to electronics as applied to communications . . . . The program focuses on the application of computers, electronics, organization and planning of fleet communications, plus the principles of managing men, money, and material.<sup>4</sup>

With the last major curriculum change, very little training now exists; instead an educational approach is offered. This is indicated by the award of a graduate degree in management. Previously, only a certificate of completion had been awarded for completion of the year Staff Communications Officer Course.

Thus, over the last forty years the communications curriculum has evolved from a practical training course into a major educational program with an emphasis on management. The majority of the technical programs which provided both training and education were absorbed by the Communications Engineering Curriculum.

#### B. THE PROBLEM UNVEILED

Not all officers who are admitted to the 620 curriculum have had an electronics background. In order to compensate for this, the 620

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<sup>3</sup> NAVAL POSTGRADUATE SCHOOL CATALOGUE for 1974-1976, p. 41.

<sup>4</sup> Ibid.



curriculum has offered a series of five electronics courses which are:

....designed to give the prospective manager sufficient knowledge to be able to discuss and understand communications technology, communications systems, signal transmission systems and systems analysis.<sup>5</sup>

Many prospective Communications Managers have understood that the 620 curriculum would not delve too deeply into the electronics aspect and would only provide a very basic understanding of the subject. However, after attending Communications Management Seminars (CO 0001) and listening to other representatives from the communications community, the impression received was that the Communications Manager should have an in depth understanding of electronics in order to carry out the duties of his billet effectively. Possibly, there has been confusion on the part of these representatives in differentiating between the relatively new (since 1970) Information Systems (Telecommunications) Curriculum and the Communications Engineering Curriculum. Because of this impression, the authors felt that there could possibly be a gap existing between the performance expectations held by other senior officers in the communications community and the capabilities of the graduate. It was because of this that the authors decided to determine if this problem really exists within the communications community.

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<sup>5</sup>Naval Postgraduate School Memorandum NC4-55Ss-plh, N. Schneidewind to C. Jones; Subject: Communications Curriculum Uniqueness Analysis, p. 6-7, 13 February 1974.



### III. RESEARCH PROCEDURE

#### A. APPROACH

In order to gather the necessary data to support the study, it was necessary to determine which survey technique was to be employed. Among the techniques considered were personal interviews, a telephone survey, and a mail survey. Before arriving at a decision, consideration had to be given to a number of factors:

1. The world-wide distribution of the survey population.
2. The limited amount of time that could be allocated to the gathering of the data.
3. The costs of the various survey techniques.
4. The time required of the respondents.

Based on these considerations, items one, two, and three eliminated the personal interview technique, although it is considered the preferred method of gathering survey information.<sup>6</sup> Similarly, the possibility of conducting a telephone survey was eliminated, although the technique possessed most of the desirable attributes of the personal interview. The decision to not employ this method was based on items three and four. Item four was especially important because it was felt that due to the

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<sup>6</sup>Rummel, J. F., and Ballaine, W. C., RESEARCH METHODOLOGY IN BUSINESS, Chap. 5, pp. 94-105, Harper, 1963.



seniority of the individuals surveyed, they would not be amenable to a protracted telephone interview.

It was determined that a mail questionnaire best suited the purpose of the study, considering the previously described criteria. A mail survey would easily reach all members of the sample of the population including at-sea staffs and commands. Four to six weeks were allocated for the return of the questionnaires. The expense, which involved only printing service and envelopes, was considered minor. Finally, it was felt that those who filled out the questionnaire could do so at their convenience.

This survey method lacked the personal contact of interviewing; however, by making detailed instructions and by making the questions as precise and unambiguous as possible, most of the desired information could be obtained.

## B. QUESTIONNAIRE DESIGN

In order to design a questionnaire that would provide the necessary data needed for the study, consideration had to be given to the possibility that a particular command might not have a Communications Manager, even though a billet requirement might exist. (In the discussion to follow, Communications Manager will mean a 9310-P coded officer.) Additionally, it was assumed that most of the aircraft carriers would not have a Communications Manager aboard. However, because of the large and complex communications installations aboard the carriers, their input was considered applicable to the study.





The questionnaire was designed to allow for several different circumstances. If the respondent actually had a Communications Manager assigned, he was asked to answer the questions based on his observations of that officer. If there was no Communications Manager assigned, the respondent was asked to answer the questions based on his opinions of the subspecialty. The dominant factor governing who should receive the questionnaire was determined to be the command's vital interest in communications and not necessarily the presence of a 9310-P subspecialist or the existence of a Communications Management billet.

The questions in the body of the questionnaire were grouped into four categories. These divisions were not expressly delineated in the questionnaire; however, all questions fell into one of the four general areas of investigation.

Questions one, two and three provided information concerning the number of 9310-P subspecialists, the number of billets requiring this subspecialty and the number of 9310-P subspecialists by rank at the respondent's command.<sup>7</sup> These data were necessary in order to establish the relative degree of contact that the respondents had experienced with the subspecialty at that command. Additionally, these questions were designed to determine to what degree other P-coded subspecialists were being used to fill these billets.

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<sup>7</sup>See APPENDIX A.



Questions four through eleven, fourteen, sixteen, seventeen, nineteen and twenty-one were primarily designed to indicate what the respondent's opinions were as to what special professional abilities, if any, were required of an officer performing in the subspecialty.<sup>8</sup> They were further designed to examine specific areas of performance especially electronics and management. These questions were considered to be the core of the study because they directly addressed the question of the characteristics of the billet and the officer filling that billet. Finally, an opportunity was provided to express any dissatisfaction with the subspecialty.

Questions twelve, thirteen, fifteen, eighteen and twenty examined areas where additional training or education might enhance the communications manager's capabilities.<sup>9</sup> These questions afforded the respondent an opportunity to suggest possible methods of improving the background of the 9310-P subspecialist.

Finally a series of inquiries were made concerning the respondent himself. These were necessary in order to help relate the responses to the respondent. This biographical series examined rank, length of service, specialty and subspecialty codes, source of commission and education. It was felt that the professional qualifications of the respondent could directly influence his answers.

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<sup>8</sup>See APPENDIX A

<sup>9</sup>Ibid.



A unique feature was incorporated into the questionnaire that allowed the respondent to apply each question directly to the individual 9310-P billets. This was done because if there were multiple billets filled by several communications managers, a single response to a question might not apply to all the billets at the command.

In order to ensure that the questionnaire did not contain ambiguities and that all applicable areas of investigation were included, the entire questionnaire was reviewed by various members of the communications community, Naval Postgraduate School staff and students. Those involved were representatives from the office of the Commander Naval Telecommunications Command, Naval Communications Station Stockton, Information Systems (Telecommunications) curricular staff, professors, instructors, students and Naval Postgraduate School staff officers. Due to time limitations a pilot survey was not conducted; however, for the purposes of the study, the previously described validation techniques were considered adequate.

### C. SAMPLING TECHNIQUE

The NAVY OFFICER BILLET SUMMARY of 1974 contains a listing of 85 commands which have a 9310-P subspecialty code billet within their organization. By using the majority of these commands along with fourteen aircraft carriers and two amphibious command ships, a high percentage of the Naval Communications Community familiar with the 9310-P subspecialty code (population) could be sampled. Of an estimated population of 100 commands a sample size of 85 was chosen. The remaining commands



were not added to the sample because of affiliation with larger units already included in the sample.

Of the 85 questionnaires mailed, 57 were returned (67% of the sample). However, two were returned unanswered so the final usable amount of responses was 64.8% of the sample.

#### D. METHOD OF ANALYSIS

The responses from the returned questionnaires were transferred to data processing cards. These results were analyzed and tabulated with the aid of a packaged computer program, The Statistical Package of the Social Sciences (SPSS).<sup>10</sup> This allowed for as complete an analysis as possible, considering the quantity of data and the time limitations involved in the study. Some other calculations, not available with SPSS, were also necessary during the study.

The first step in the analysis was to obtain a frequency distribution of the data. The use of the resulting histograms provided by the SPSS package made comparison analysis much easier.

Other methods used to help prove or disprove the hypothesis included Chi-square ( $\chi^2$ ) and Kolmogorov-Smirnov (K-S) tests and correlation analysis. An explanation of these methods is given in Appendix B.

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<sup>10</sup>Nie, N., Bent, D. H., and Hull, C. H., Statistical Package for the Social Sciences (SPSS), McGraw-Hill, 1970.





#### IV. PRESENTATION OF THE DATA

Questions one and two were considered unusable for any meaningful analysis. This was due to a sizable number of respondents who apparently answered the questions incorrectly. There seemed to be no distinction between those who were "9310-P subspecialists" and those who filled a 9310-P subspecialty code billet." This ambiguity could have possibly been clarified had there been a longer validation period.

The instructions in the questionnaire had asked for multiple answers to be given for certain designated questions according to the response given in question one: "The number of 9310-P code billets within the command are: (Please indicate)." Because of so many incorrect responses (many simply listed general communications billets), the use of multiple responses was eliminated.

However, it was determined that the first three questions could be modified by determining the existence or nonexistence of a Communications Management subspecialist at the respondent's command. Thus, the first three questions were translated into a single yes or no response. Accordingly, all questions having multiple responses were evaluated as missing variables. This process caused a loss of data; however, the loss was considered in no way significant. The average number of lost responses was eight per question. The letter "n" signifies the number of usable responses out of a total of 55.



## A. FORMAT

Each question was evaluated individually, as it was determined that this method constituted the most meaningful way of initially introducing the data. The questions and responses are presented as they appeared in the questionnaire.

Immediately following each response, under the heading "EXPECTED," is the number of responses that were anticipated prior to the survey. These estimates were calculated by multiplying the actual total number of responses for each question by an expected percentage. These expected percentages reflect the hypothetical distribution that tend to confirm the original hypothesis. This distribution was based on a study conducted by the Director, Professional Manpower Management Unit (OP-01BE) of the Office of the Chief of Naval Operations. The purpose of this study was to elicit a forecast of the Navy's officer subspecialty requirements in the field of Information Systems (Communications) during the next ten years.<sup>11</sup>

This distribution was also based on comments obtained from a study conducted in 1971 by students of the then Communications Management

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<sup>11</sup>U. S. Department of the Navy, Office of Chief of Naval Operations, Professional Manpower Management Unit Letters OP-01BE to Staff, Commander in Chief, U. S. Pacific Fleet, Subject: Professional Manpower Forecast in the Field of Information Systems (Communications), 22 December 1972, 3 March 1973, and 24 August 1973.



Curriculum which evaluated overall course content.<sup>12</sup> A second column entitled "ACTUAL" shows the number of responses and the percentage of the total, for the questions that were tabulated from the returned questionnaires. The data is then represented in a graphical form with possible responses represented on the vertical axis and the number of tabulated responses, both expected and actual, on the horizontal axis. Following the graph are the sample size (n) and the results of the Chi-square ( $\chi^2$ ) and the Kolmogorov-Smirnov (K-S) tests. These tests for determining acceptance or rejection are based on the premise that if the expected distribution is to be accepted, this distribution should closely parallel, within certain percentage limits, the distribution of the actual sample. In this case, it was determined that the acceptance criteria would be based on the probability that at least 95% of the time the two distributions would parallel one another and could be assumed to be from the same population. The rejection criteria was based on the probability that five percent (or less) of the time the expected and actual distributions came from the same population. For both tests, a level of significance of .05 was used. A final note on missing value information and the acceptance or rejection of the expected distribution is then provided.

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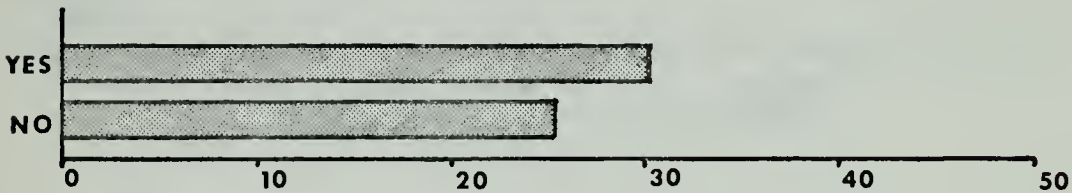
<sup>12</sup>D. R. Larson, and W. C. Bobo, Evaluation of the Naval Postgraduate School Communications Management Curriculum, directed study conducted for Professor J. M. Creighton, U. S. Naval Postgraduate School, 15 March 1971.



## B. PRESENTATION

### 1. Questions One, Two, and Three

As consolidated, questions one, two and three yielded a single variable. Tabulation of this variable indicated that 30 (54.5%) of the respondents actually had a Communications Manager (9310-P) sub-specialist serving within the command and 25 (45.5%) did not.



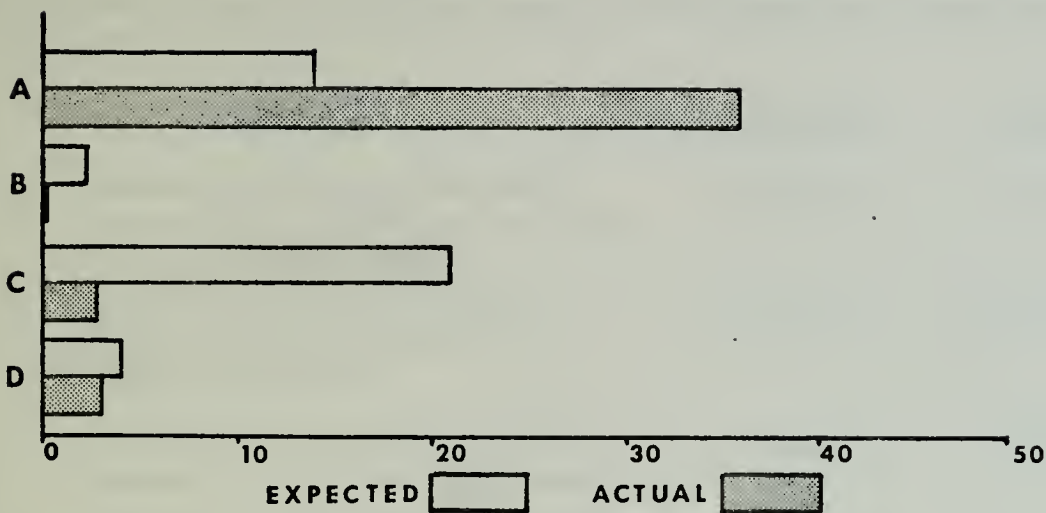
### 2. Question Four

In your opinion, the primary function(s) of the officer(s) filling Communications Manager (9310-P) subspecialty code billet(s) is (are):

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Administrator/manager	14 (35%)	36 (87.7%)
B.	Watch Officer	2 (5%)	0 (0%)
C.	Equipment/systems specialist	21 (50%)	2 (5%)
D.	Other	4 (10%)	3 (7.3%)







$n = 41$

Chi-square ( $\chi^2$ ) = 57.98 > 11.07 for 3 df

K-S Test = .23 > B = .205

Missing Values = 11

Reject expected distribution<sup>13</sup>

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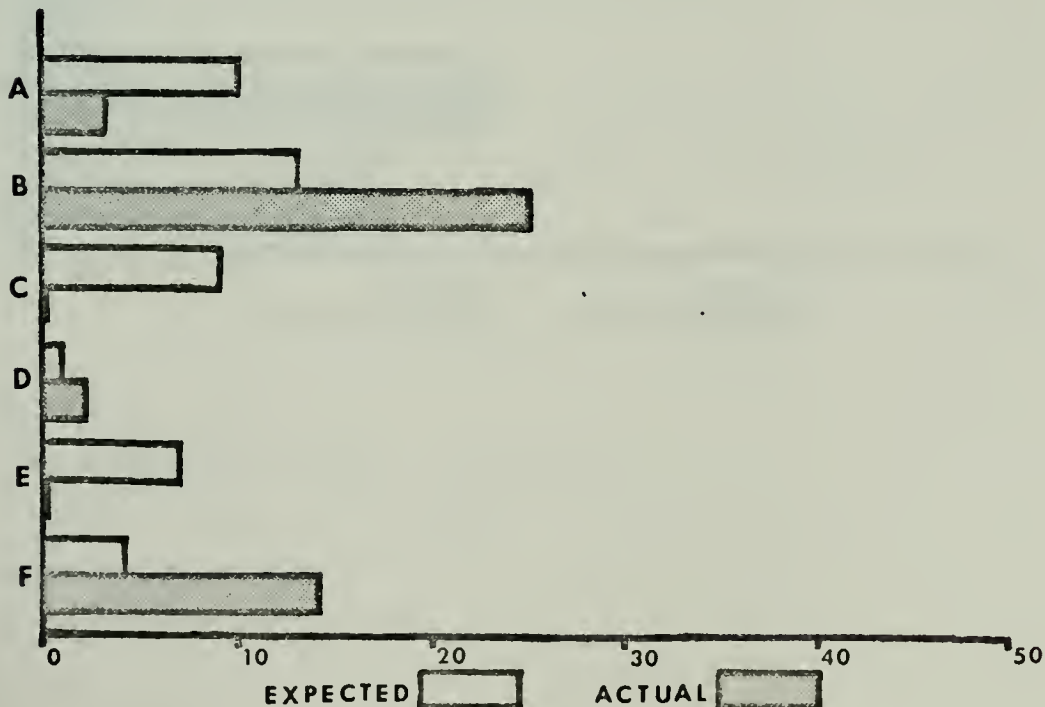
<sup>13</sup>For ease in presentation, for the Chi-square test df signifies degrees of freedom and for the K-S Test the equation  $1.36/\sqrt{n}$  will be signified by B. The level of significance for all tests was the .05 level. For further explanation of Chi-square and K-S testing procedures, consult APPENDIX B.



### 3. Question Five

What professional background or experience would you most prefer the officers filling your present billets requiring Communications Managers (9310-P) to have?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Warrant Officer/Limited Duty Officer without graduate education.	10 (23%)	3 (7%)
B.	Navy Postgraduate School Communications Management Program graduate.	13 (30%)	25 (57%)
C.	Completion of a graduate level program in Electronics Engineering.	9 (20%)	0 (0%)
D.	Unrestricted Line Officer (with no previous communications experience).	1 (2%)	2 (4%)
E.	Civilian University Communications Management graduates (e.g. George Washington University).	7 (15%)	0 (0%)
F.	Other.	4 (10%)	14 (32%)





n = 44

Chi-square ( $\chi^2$ ) = 57.98 > 11.07 for 5 df

K-S Test = .23 > B = .205

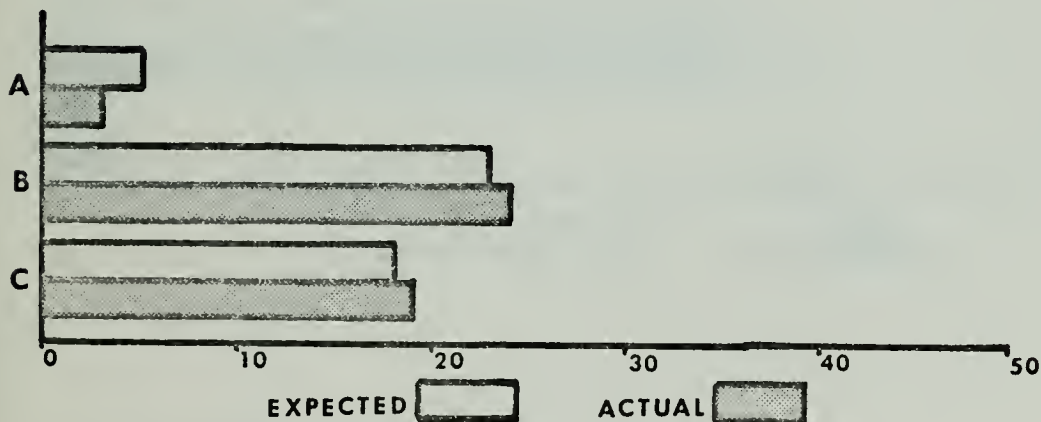
Missing Values = 11

Reject expected distribution

#### 4. Question Six

Do you feel that the billets requiring Communications Managers (9310-P) could be satisfactorily filled by officers who have not completed the formal Naval Postgraduate School (NPS) Information Systems (Telecommunications) Program?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Only with great difficulty.	5 (10%)	3 (6.5%)
B.	With some difficulty.	23 (50%)	24 (52.2%)
C.	With no difficulty.	18 (40%)	19 (41.3%)



n = 46

Chi-square ( $\chi^2$ ) = .899 < 5.99 for 2 df

K-S Test = .0435 < B = .2005

Missing Values = 9

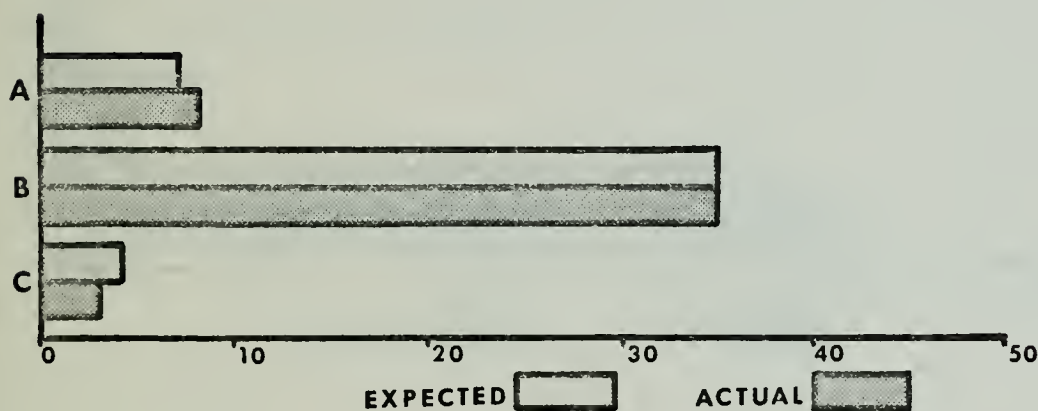
Accept expected distribution



## 5. Question Seven

Do you expect the Communications Manager (9310-P) sub-specialist's knowledge of communications systems to be:

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	A basic understanding (general understanding of communications systems).	7 (15%)	8 (17%)
B.	Knowledgeable (a good understanding of system's equipment operation).	35 (75%)	35 (75%)
C.	High level of technical knowledge (e.g. completion of a graduate level program in Electronics Engineering).	4 (10%)	3 (8%)



n = 46

Chi-square ( $\chi^2$ ) = .39 < 5.99 for 2 df

K-S Test = .0217 < B = .2005

Missing Values = 9

Accept expected distribution

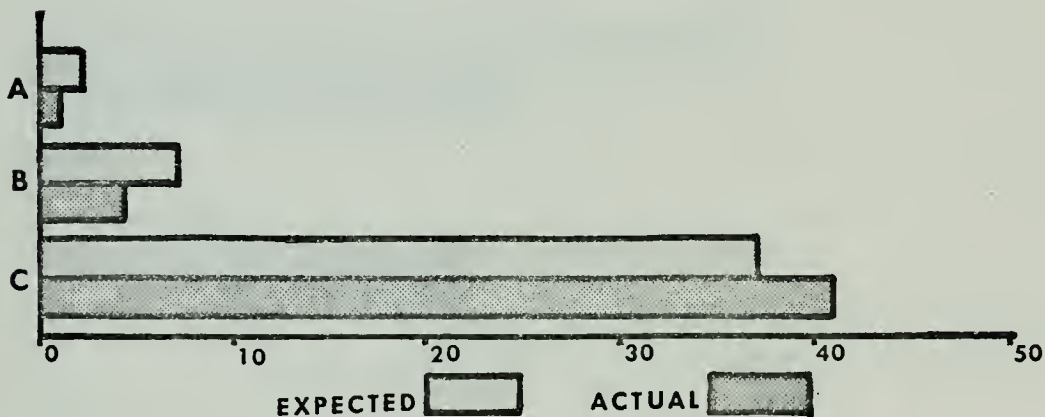




## 6. Question Eight

To what extent do you expect a Communications Manager (9310-P) to deal with communications/electronic equipment failure (primarily)?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Be able to troubleshoot and repair the casualty himself if required.	2 (5%)	1 (2.2%)
B.	Direct (manage) repair personnel.	7 (15%)	4 (8.7%)
C.	Have an understanding of how the equipment failure affects the communications system.	37 (80%)	41 (89.1%)



n = 46

Chi-square ( $\chi^2$ ) = 2.22 < 5.99 for 2 df

K-S Test = .0869 < B = .2005

Missing Values = 9

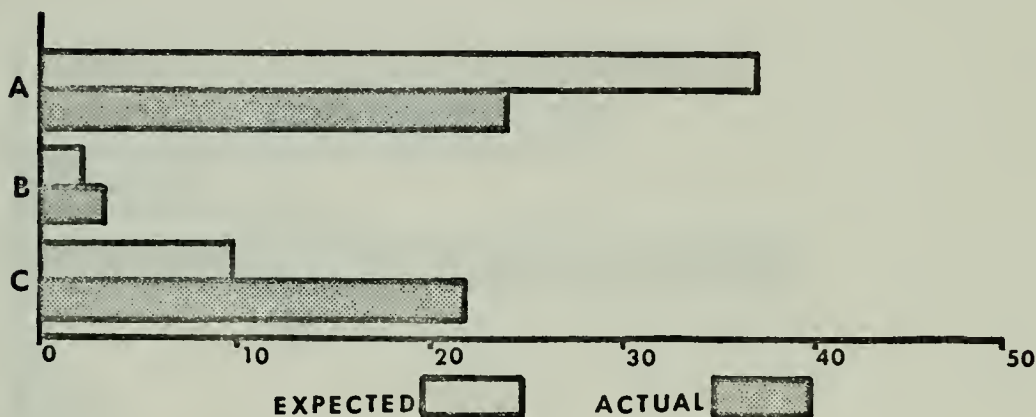
Accept expected distribution



## 7. Question Nine

Do you feel that having a graduate from the NPS Information Systems (Telecommunications) Program under your supervision would (has) increase(d) the effectiveness of the operation of your command/department/division/etc.?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Yes, to a significant degree.	37 (75%)	24 (50%)
B.	No, effectiveness of unit has decreased.	2 (5%)	3 (6%)
C.	Unchanged, unit effectiveness has remained the same.	10 (20%)	22 (44%)



n = 49

Chi-square ( $\chi^2$ ) = 19.47 > 5.99 for 2 df

K-S Test = .2653 > B = .1942

Missing Values = 6

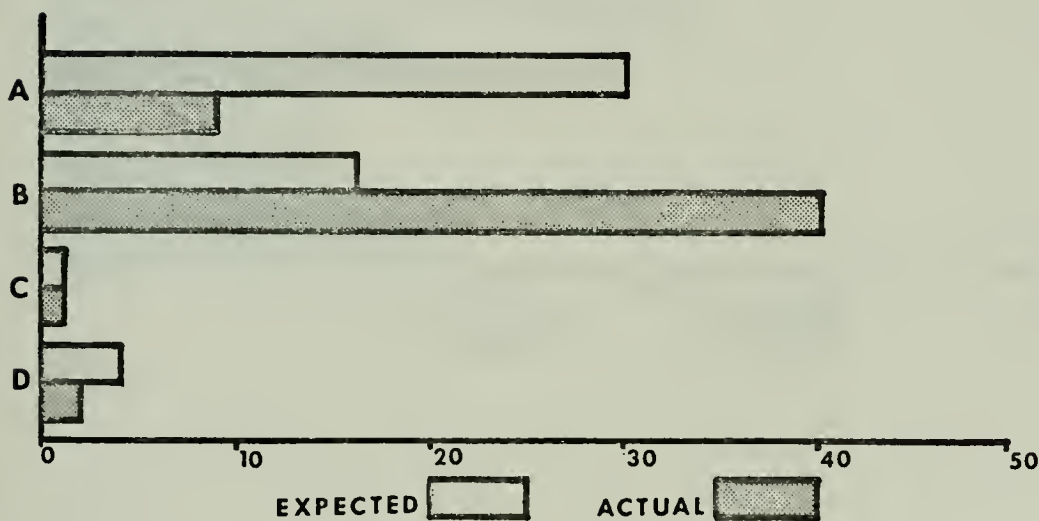
Reject expected distribution



## 8. Question Eleven

Based solely on your overall personal concept of the Communications Management (9310-P) Subspecialty, you would expect an officer with this proficiency code to be:

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	A manager/administrator with extensive technical knowledge.	31 (60%)	9 (17%)
B.	A manager/administrator with some technical knowledge.	16 (30%)	40 (77%)
C.	A manager/administrator with no technical knowledge.	1 (2%)	1 (2%)
D.	Other.	4 (8%)	2 (4%)



n = 52

Chi-square ( $\chi^2$ ) = 52.61 > 7.82 for 3 df

K-S Test = .423 > B = .1886

Missing Values = 3

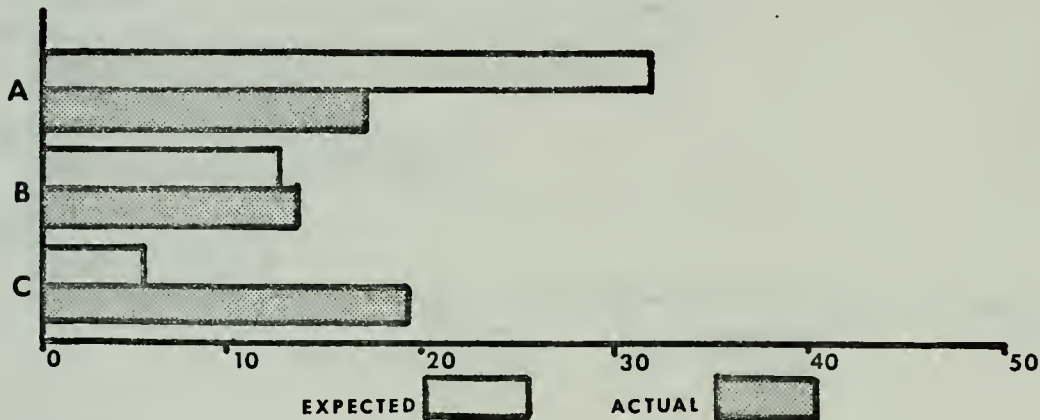
Reject expected distribution



9. Question Twelve

Do you feel that the graduates of the NPS Information Systems (Telecommunications) Curriculum filling 9310-P billets should require additional functional training in electronics (e.g. service schools)?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	No additional training required.	31 (65%)	16 (33.3%)
B.	Informal on-the-job training sufficient.	12 (25%)	13 (27.2%)
C.	Additional functional training required.	5 (10%)	19 (39.5%)



n = 48

Chi-square ( $\chi^2$ ) = 46.54 > 5.99 for 2 df

K-S Test = .3125 > B = .1963

Missing Values = 7

Reject expected distribution

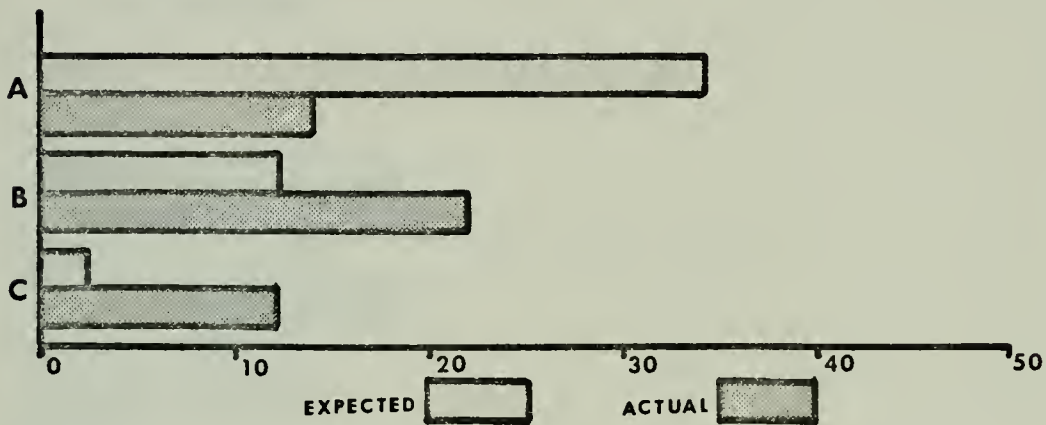




# 10. Question Thirteen

Do you feel that graduates of the NPS Information Systems (Telecommunications) Curriculum filling 9310-P billets should require additional education in management (e.g. personnel, systems, or financial management)?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	No additional education required.	34 (70%)	14 (29.2%)
B.	On-the-job experience sufficient.	12 (25%)	22 (45.8%)
C.	Additional formal education required.	2 (5%)	12 (25%)



n = 48

Chi-square ( $\chi^2$ ) = 70.04 > 5.99 for 2 df

K-S Test = .4167 > B = .1963

Missing Values = 7

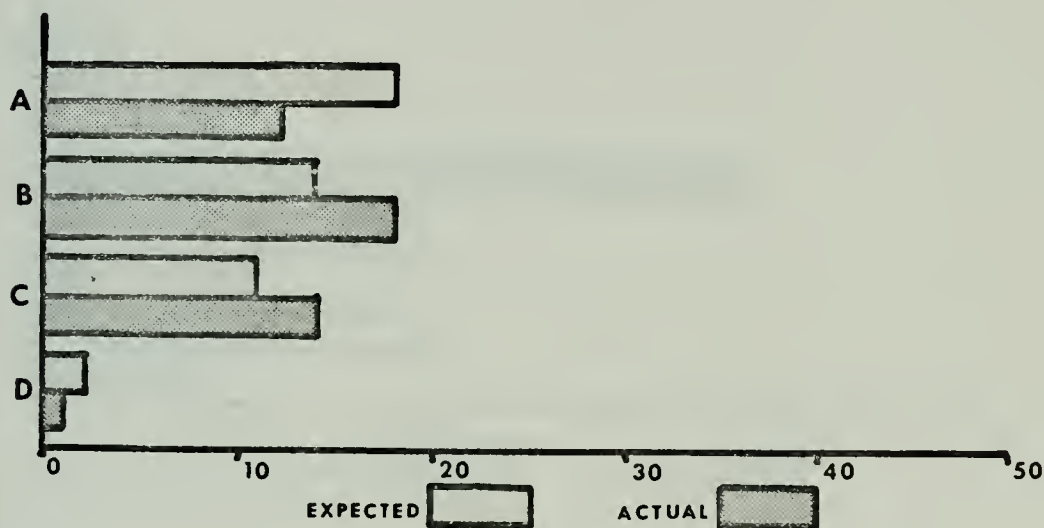
Reject expected distribution



# 11. Question Fourteen

In your estimation, would a newly assigned Information Systems (Telecommunications) graduate, because of his NPS education, require less time to "settle in" to his billet and become fully effective in the performance of his duties than a non-graduate of the program?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Much less time required.	18 (40%)	12 (27%)
B.	Somewhat less time required.	14 (30%)	18 (40%)
C.	About the same time as a non-graduate.	11 (25%)	14 (31%)
D.	Requires more time than a non-graduate.	2 (5%)	1 (2%)



n = 45

Chi-square ( $\chi^2$ ) = 5.46 < 7.82 for 3 df

K-S Test = .1333 < B = .2027

Missing Values = 10

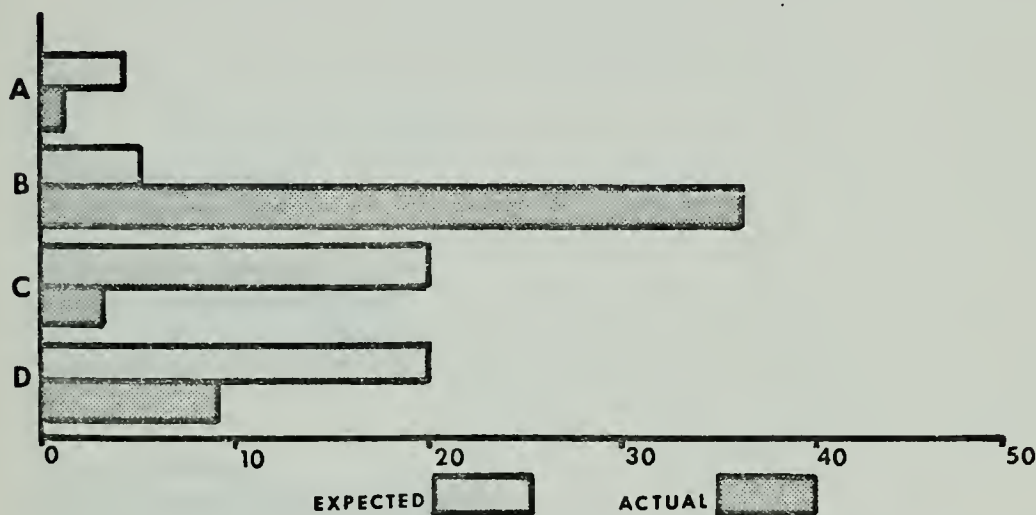
Accept expected distribution



## 12. Question Sixteen

To what extent should the Communications Manager (9310-P) within your command be familiar with automated and/or computerized message processing systems?

<u>RESPONSES</u>		<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Be able to operate terminal equipment.	4 (8%)	1 (2%)
B.	Understand overall system.	5 (10%)	36 (74 %)
C.	Both A and B above.	20 (41%)	3 (6%)
D.	Not within the billet's area of responsibility.	20 (41%)	9 (18%)



n = 49

Chi-square ( $\chi^2$ ) = 215 > 7.82 for 3 df

K-S Test = .5714 > B = .1942

Missing Values = 6

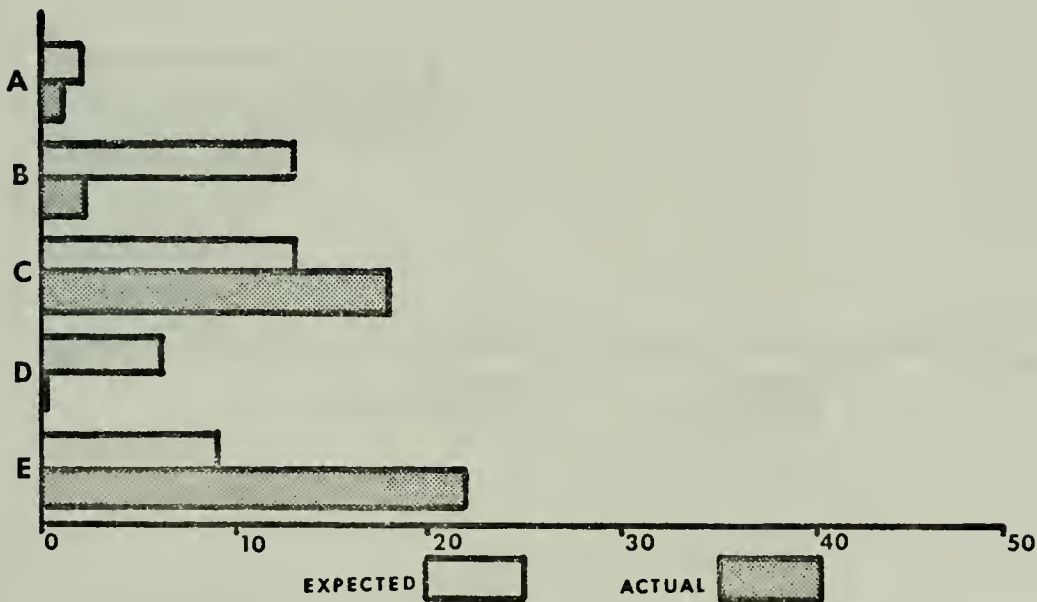
Reject expected distribution



### 13. Question Seventeen

Based on the requirements of the 9310-P billets within your command, the emphasis on automatic data processing (ADP) is directed toward:

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Programming (Software).	2 (5%)	1 (2%)
B.	Equipment operations (Hardware).	13 (30%)	2 (5%)
C.	Systems Management.	13 (30%)	18 (42%)
D.	Systems Design.	6 (15%)	0 (0%)
E.	Not applicable.	9 (20%)	22 (51%)



$n = 43$

Chi-square ( $\chi^2$ ) = 36.5 > 9.49 for 4 df

K-S Test = .3023 > B = .2074

Missing Values = 12

Reject expected distribution

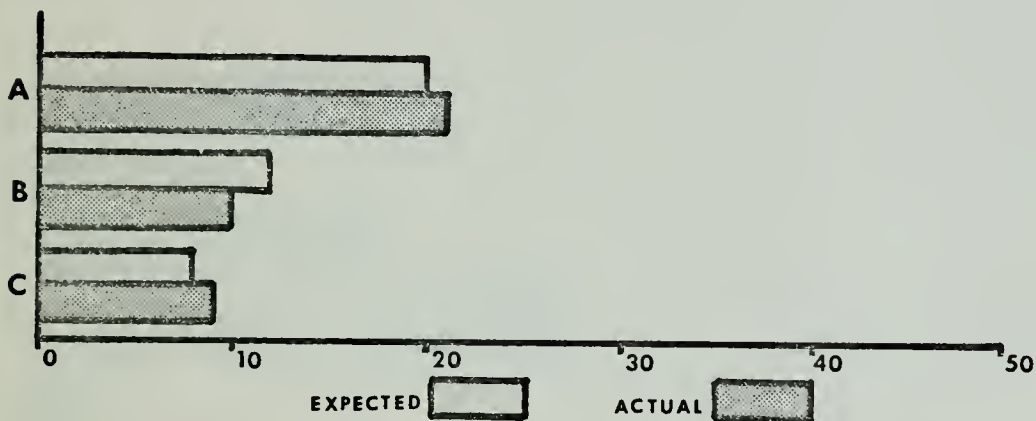




#### 14. Question Eighteen

Do you feel that the graduates of the Information Systems (Telecommunications) Curriculum filling the 9310-P billets at your command require additional functional training in the Automatic Data Processing field?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	No additional functional training required.	20 (50%)	21 (52.5%)
B.	Informal on-the-job training sufficient.	12 (30%)	10 (25%)
C.	Additional functional training required.	8 (20%)	9 (22.5%)



$n = 40$

Chi-square  $(\chi^2) = .51 < 5.99$  for 2 df

K-S Test = .025 < B = .215

Missing Values = 15

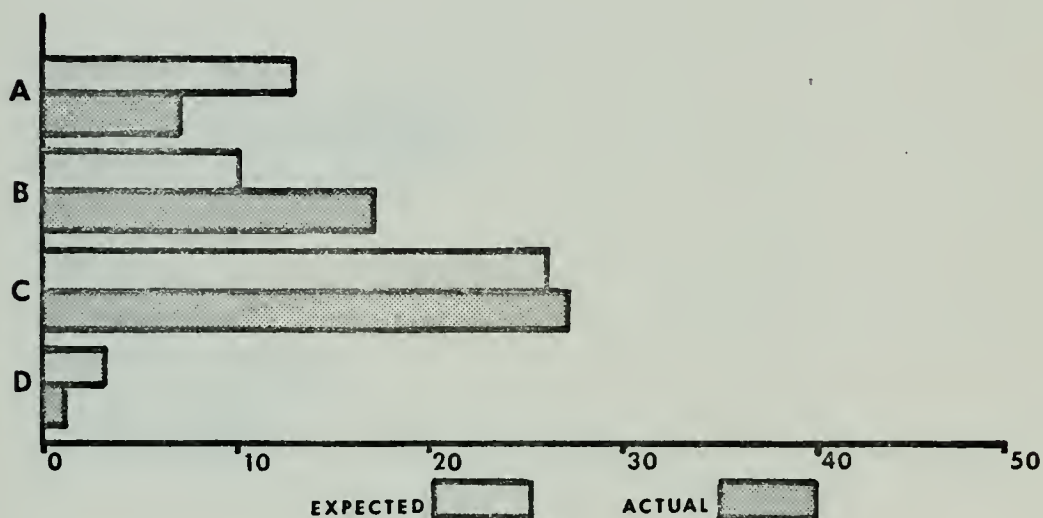
Accept expected distribution



# 15. Question Nineteen

Do you feel that the needs of the Naval Communications System could best be served by establishing a communications specialist program rather than a subspecialist?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	Strictly specialist (e.g. Army Signal Corps).	13 (25%)	7 (13.5%)
B.	Strictly subspecialist (e. g. current Navy system).	10 (20%)	17 (32.5%)
C.	Combination of both specialist and subspecialist.	26 (50%)	27 (52%)
D.	Other.	3 (5%)	1 (2%)



n = 52

Chi-square ( $\chi^2$ ) = 6.73 < 7.82 for 3 df

K-S Test = .1153 < B = .1886

Missing Values = 3

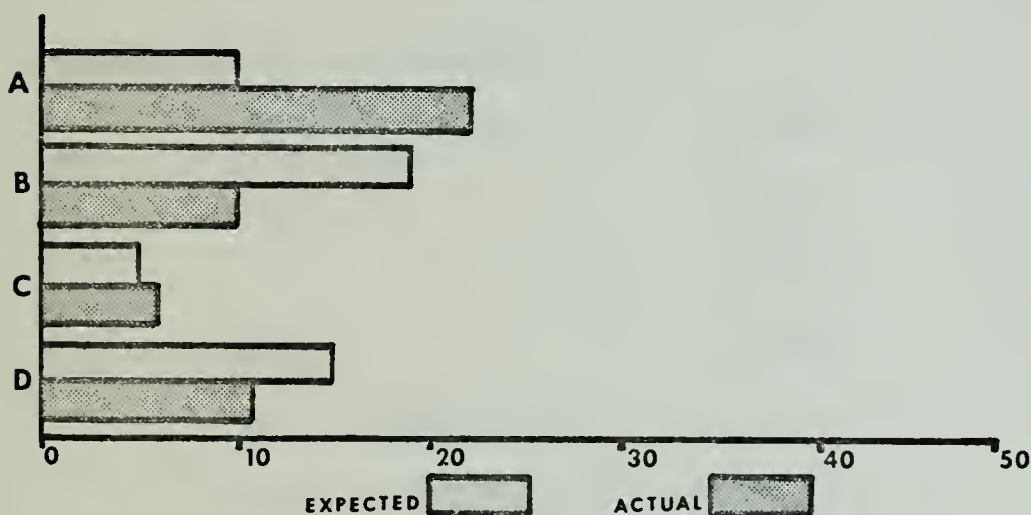
Accept expected distribution



## 16. Question Twenty

Do you feel that the graduates from the NPS Information Systems (Telecommunications) Curriculum filling the 9310-P billets at your command require additional education in Operations Research (e.g. message queing analysis, message network analysis, and equipment reliability)?

	<u>RESPONSES</u>	<u>EXPECTED</u>	<u>ACTUAL</u>
A.	No additional education required.	10 (20%)	22 (45%)
B.	Informal on-the-job experience is sufficient.	19 (40%)	10 (20%)
C.	Additional education required.	5 (10%)	6 (12%)
D.	Not applicable to the job.	15 (30%)	11 (23%)



n = 49

Chi-square ( $\chi^2$ ) = 12.08 > 7.82 for 3 df

K-S Test = .2448 > B = .1942

Missing Values = 6

Reject expected distribution



17. Question Twenty-One

Your knowledge of the Information Systems (Telecommunications) Program at the Naval Postgraduate School is based on:

	<u>RESPONSES</u>	<u>ACTUAL</u> <sup>14</sup>
A.	Published literature describing the program.	22
B.	Informal conversations with other officers.	16
C.	Tour of duty as a student at the Naval Postgraduate School.	16
D.	Service with graduates or students of the program.	22
E.	No knowledge of the program.	6

18. Question Twenty-Two

My present rank is:	LCDR	22 (40%)
	CDR	16 (29.1%)
	CAPT	15 (27.3%)
	RADM	2 (3.6%)

19. Question Twenty-Three

Number of years service I have completed:

10-14	20 (36.4%)
15-20	9 (16.3%)
> 20	26 (47.3%)

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<sup>14</sup> Remaining questions concern biographical data for which there were no predetermined response percentages.





20. Question Twenty-Four

My designator is:

None	1 (1.8%)-Army
1100	1 (1.8%)
1110	34 (61.9%)
1120	2 (3.6%)
1310	12 (21.9%)
1320	2 (3.6%)
1610	1 (1.8%)
6570	2 (3.6%)

21. Question Twenty-Five

My subspecialty code (P-code) is:

None	18 (32.8%)
7160	1 (1.8%)
8110	1 (1.8%)
8800	1 (1.8%)
8810	13 (23.6%)
9111	1 (1.8%)
9300	7 (12.8%)
9310	11 (20%)
9610	2 (3.6%)



22. Question Twenty-Six

My source of commission is:

Naval Academy	17 (30.9%)
NROTC-Regular	8 (14.6%)
NROTC-Contract	2 (3.6%)
OCS	10 (18.2%)
NESEP-OCS	1 (1.8%)
LDO-WARRANT Program	1 (1.8%)
Other <sup>15</sup>	16 (29.1%)

23. Question Twenty-Seven

I have received the following degree(s):

None	9 (16.4%)
BS , MS EE; BS Comm. Engineering	12 (21.8%)
MS Comm. Mgt.	5 (9.1%)
MS Mgt.	2 (3.6%)
BS Political Sci. MS Int. Affairs	6 (10.9%)
BS Other	14 (25.5%)
BA, MA Other	7 (12.7%)

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<sup>15</sup> Most of these were commissioned through the Air Officer Candidate Program.



## C. ANALYSIS

To further analyze the data, it was necessary to examine the four general categories discussed previously. Each question was determined to be in one of these areas, and taken together some general patterns evolved.

The questions that were intended to establish the number of billets and officers attached to a command requiring a Communications Management Subspecialty were modified to simply determine the existence or non-existence of a subspecialist. Of the respondents, 54.5% indicated that a 9310-P subspecialist was attached to the command. Considering that 18.8% of the units surveyed were not expected to have a Communications Manager assigned, this percentage was significant. It can be assumed that these respondents based their answers on close observation or at least some direct contact with the Communications Manager. It was hypothesized that there might be a difference between the responses based on observation of Communications Managers within the command, and those based on opinions of respondents who had no Communications Manager within the command. However, using these two criteria as the controlling variables, cross-tabulations did not show any discernable difference between the response patterns. The conclusion was therefore made that the replies of all respondents should be considered equally valid.

The second general category which was used to investigate the special skills and the performance level expected of the 9310-P subspecialist showed a uniformity of responses. No single variable or



combination of variables displayed any marked deviation from the overall response pattern. In this category, the responses to questions six, seven, eight and nineteen were such that they closely paralleled the expected distribution. Of these four questions, only question six was considered to have significantly supported the original hypothesis. Of the 46 responses to this question, only three (6.5%) indicated that a non-graduate of the Naval Postgraduate School Information Systems (Telecommunications) Program would have any great difficulty in filling a 9310-P billet. Kendall correlation tests did not reveal any significant relationships between this question and the rest of the survey. However, there did seem to be a direct relationship with the comments that were solicited from the respondents. This will be discussed in greater detail later. The only other question of importance in the group was question five. The marked preference for Navy Postgraduate Communications Program graduates (57%) outweighed any preference for Warrant Officers or Limited Duty Officers (7%). Additionally, the survey showed a desire for officers with a general understanding of the various aspects of the subspecialty rather than technical expertise. This preference is indicated by the responses to the remainder of the questions in the group and directly refutes any possibility that Communications Managers should be more technically oriented.

In the third group of questions, which investigated areas of additional training, only question twelve, which dealt with electronics, indicated any real need for greater emphasis. In question twelve, 39.5% of the respondents felt that additional training was required.





The biographical data that was obtained about the respondents revealed a rather wide spectrum of backgrounds and experience. Particularly noteworthy is the high percentage of relatively senior officers who completed the questionnaire. Fifteen Captains and two Admirals responded for a total of 30.9% of the total. It was felt that the attention received from these senior personnel greatly enhanced the validity of the results of the survey and the conclusions derived from it.

#### D. RESPONDENT COMMENTS

The questionnaire provided several sections for the respondents to make subjective comments. Results indicated that the respondents' statements fell into three general categories: Communications Officers School desired, previous communications experience desired, and other training or education desired.

The most emphasized point on the part of the respondents (62%) was that a graduate of the Information Systems (Telecommunications) Curriculum reporting to their command should have some form of communications experience, which could be either attendance at the U. S. Naval Communications Officer Afloat Course or actual fleet communications experience. It was indicated that a graduate without this experience would initially be a detriment to the command until on-the-job training could make up for the lack of a communications related background. Results from question five indicated that the majority of the respondents desired those filling 9310-P billets to be Navy Postgraduate School Information Systems (Telecommunications) Program graduates who have had previous communications



experience. This was reflected by the large number of write-in comments in responses 'B' and 'F' of question five. Respondents indicated in questions six, ten, twelve and twenty-eight however, that officers who were not graduates of the 620 program would have little or no difficulty filling a 9310-P billet provided they had recent communications experience. These comments gave every indication that communications training and experience (the more recent the better) was just as important as the education received at the Naval Postgraduate School with respect to the initial effectiveness of an officer just assigned in a 9310-P billet.

Many (40%) of the respondents stressed the need for Communications Managers to have a good working knowledge of standard fleet and allied communications procedures. Since a sizable number of Communications Managers are assigned to communications stations and major staffs which communicate primarily with the Naval operational forces, respondents indicated that it was imperative that this knowledge be obtained prior to arrival at the command to ensure maximum effectiveness during the turnover and relief periods of the officers concerned.

Another area of training or education which was mentioned by the respondents was to have Communications Managers get more practical experience with computer systems used in the Naval Communications System, such as training at a Naval Communications Processing and Routing System (NAVCOMMPPARS) or Local Digital Message Exchange (LDMX) installations. This would allow the Communications Manager to have a better understanding of the capabilities and limitations of the



overall processing system than if he were to get only theoretical instruction in courses at the Naval Postgraduate School.

Overall, the respondents indicated a strong desire for previous communications experience and an emphasis on "hands-on" training to bolster this experience. They seemed to indicate that there should be some training introduced into the 620 curriculum in order to give more practical experience to the future 9310-P billet holder and help alleviate apparent problems caused by recently graduated Communications Managers assigned to 9310-P billets and who have no previous communications experience.



## V. CONCLUSION

### A. FINDINGS

There was an obvious difference between the distribution of various responses provided by the questionnaire and the written comments supplied by the respondents. The basic survey results indicate a preference for Information Systems (Telecommunications) graduates. The comments of the respondents repeatedly stressed that a requirement exists for recent practical experience in communications. The conclusion inferred is that a Naval Postgraduate education is desirable, but only so when coupled with experience.

The hypothesis that, 'a definite difference does exist between the educational objectives of the Naval Postgraduate School and the expectations of the users of these graduates,' must be rejected. The survey results confirmed that the education provided is considered adequate by operational commands. The mission of the Naval Postgraduate School, however, is to provide only education. The survey results further indicated that this education is not the primary method of assuring an officer's success as a 9310-P subspecialist. Commands do require that such an officer have a working knowledge of current communications systems. Such training is not within the scope of the Information Systems (Telecommunications) Curriculum.

The questionnaire was not designed to investigate in detail the problem of education versus experience and training. The conclusions





regarding this area are therefore based on subjective rather than quantitative analysis. Further investigation of this fundamental problem is strongly indicated. Time limitations, however, precluded an attempt at further elaboration by this study.

## B. RECOMMENDATIONS

After review of the tabulated data and comments of the respondents, the following recommendations were arrived at:

A. Presently, it is an objective of the Naval Postgraduate School to provide education and not training to its students. Apparently, in the view of the operating forces involved with communications, training and experience are as important as education, if not more so. Since there presently is no past communications experience prerequisite for admission to the Information Systems (Telecommunications) Curriculum, it is recommended that there be more 'hands-on' training and practical experience introduced into the curriculum in order that recently graduated Communications Managers may more readily succeed within their newly assigned billet.<sup>16</sup>

B. As stated previously, former communications experience or training is not a requirement for admission to the Information Systems

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<sup>16</sup>Just prior to completion, it was announced that the curriculum would be altered to include a two-week experience tour, during the fourth or fifth quarters, at the Naval Communications Station, San Francisco (Stockton) along with some shipboard (CVA/CV) communications experience.



(Telecommunications) Curriculum. Without practical experience and training, the newly assigned Communications Manager is initially a detriment to the Naval Communications System. It is recommended, that in order to help alleviate this problem, recent communications experience be made a requirement for admission to the program. If this is not practical, assure that follow-on tours are such that this experience can be obtained prior to being assigned to a 9310-P billet.

C. In order to facilitate the implementation of training into the 620 curriculum, it is recommended that the program be modified to include detailed instruction in service communications systems procedures. This could be accomplished in the 'Communications Organization' courses and the final required Electronics Engineering course on communications systems.

D. In order to give the prospective Communications Manager an even better fundamental base, it is recommended that an experience tour to communication stations or major staff communications facilities be instituted within the Information Systems (Telecommunications) Curriculum. The thesis requirement would in turn be altered to a detailed report on the tour rather than an independently selected study.

#### C. RECOMMENDED FUTURE RESEARCH

A future study could be conducted by sending out a follow-on questionnaire. This questionnaire would be a modified version of the questionnaire used in this study. The recipients should be officers currently assigned to a Communications Management (9310-P) billet.



The data obtained could then be compared with the data presented in the thesis. The result would be a composite picture of the 9310-P sub-specialty as it exists today.



APPENDIX A  
QUESTIONNAIRE

To:

Subj: Attitude Study

Encl: (1) Questionnaire

1. The enclosed questionnaire has been prepared by two students in the Information Systems (Telecommunications) (formerly Communications Management) curriculum. These students are jointly pursuing a Master's level thesis entitled "Performance Expectations of the Communications Manager." This thesis is an investigation into the requirements of both operating forces and headquarters activities for subspecialists in Communications Management (P-code 9310P). The thesis objective is to determine whether the education provided in the Information Systems (Telecommunications) curriculum is meeting the needs of users of curriculum graduates.
2. Your time and effort in completing and returning the questionnaire with respect to officers assigned to your immediate staff/command are greatly appreciated. Your response will make a meaningful contribution to providing relevant Naval Postgraduate School curricula which meet service needs.
3. In the event that there is no officer presently assigned who has the 9310P subspecialty code, your responses are still very important. In this case, it is requested that your responses to the questions be based on what you feel the skills and abilities of the 9310P Communications Manager should be.
4. Only the aggregate results of the complete survey will be used in the thesis, thereby preserving anonymity of respondents. The individual responses will be treated as confidential information and destroyed upon completion of the thesis.

D. W. KILEY  
By direction





## INSTRUCTIONS

Question 1 asks you to list the various Communications Manager (9310P) billets presently required within the command. On several occasions throughout the remainder of the questionnaire you are requested to indicate after each individual response the billet that is most applicable for that particular response. (These questions are followed by a \*\*\*) For ease in completing these questions please indicate the billets by letter as listed in question 1. For example, a command may have three billets all requiring officers having Communications Manager (9310P) subspecialty codes. For the purpose of this example, assume that the command's Executive Officer, Communications Officer, and Technical Control Officer fall into this category. The completed question 1 will then look like:

1. The billets within the command requiring Communication Management (9310P) subspecialty codes are: (Please indicate billet title.)

- A. Communications Officer
- B. Executive Officer
- C. Technical Control Officer
- D. \_\_\_\_\_
- E. \_\_\_\_\_
- F. \_\_\_\_\_
- G. \_\_\_\_\_
- H. \_\_\_\_\_
- I. None



A later question followed by \*\*\* might be completed as below:

A billet requiring a Communications Manager (9310P) Subspecialist has the requirement to travel to off-base installations; \*\*\*

- A. Often B
- B. Occasionally \_\_\_\_\_
- C. Almost never A & C

The letter B after the response "Often" in the above denotes the Executive Officer's billet from question 1 and indicates that the billet requires extensive travel. Similarly, A and C after the response "Almost never" denotes the Communications Officer and the Technical Control Officer. This response indicates that these officers are seldom required to travel. The intent of the foregoing is to allow for the fact that various billets have different requirements. Please check or complete as indicated the most appropriate response for the remaining questions.

1. The billets within the command requiring Communications Management (9310-P) subspecialty codes are: (Please indicate billet title)
- A. \_\_\_\_\_
- B. \_\_\_\_\_
- C. \_\_\_\_\_
- D. \_\_\_\_\_
- E. \_\_\_\_\_
- F. None

(Keep unfolded for easy reference)



2. The number of officers responsible to you who fill a Communications Manager (9310P) Subspecialty code billet are:

(Please indicate) \_\_\_\_\_

3. The number of Communications Managers (9310P) Subspecialists under your supervision by rank is: (Please indicate number of each in the space to the right)

A. CDR \_\_\_\_\_

B. LCDR \_\_\_\_\_

C. LT \_\_\_\_\_

D. LTJG \_\_\_\_\_

E. None \_\_\_\_\_

4. In your opinion, the primary function(s) of the officer(s) filling Communications Manager (9310P) Subspecialty code billet(s) is (are):\*\*\*

A. Administrator/Manager \_\_\_\_\_

B. Watch Officer \_\_\_\_\_

C. Equipment/Systems Specialist \_\_\_\_\_

D. Other (Please indicate) \_\_\_\_\_

5. What professional background or experience would you most prefer the officers filling your present billets requiring Communications Managers (9310P) to have? \*\*\*

A. Warrant Officer/Limited Duty Officer without graduate education \_\_\_\_\_

B. Navy Postgraduate School Communications Management Program graduate \_\_\_\_\_

C. Completion of a graduate level program in Electronics Engineering \_\_\_\_\_



- D. Unrestricted Line Officer (with no previous communications experience) \_\_\_\_\_
- E. Civilian University Communication Management graduates (e.g. George Washington University) \_\_\_\_\_
- F. Other (Please indicate) \_\_\_\_\_

6. Do you feel that the billets requiring Communications Managers (9310P) could be satisfactorily filled by officers who have not completed the formal Naval Postgraduate School (NPS) Information Systems (Telecommunications) Program? \*\*\*

- A. Only with great difficulty \_\_\_\_\_
- B. With some difficulty \_\_\_\_\_
- C. With no difficulty \_\_\_\_\_

7. Do you expect the Communications Manager (9310P) Subspecialist's knowledge of communications systems to be: \*\*\*

- A. A basic understanding (general understanding of communications systems) \_\_\_\_\_
- B. Knowledgeable (a good understanding of system's equipment operation) \_\_\_\_\_
- C. High level of technical knowledge (e.g. completion of a graduate level program in Electronics Engineering) \_\_\_\_\_

8. To what extent do you expect a Communications Manager (9310P) to deal with communications/electronic equipment failure (primarily)? \*\*\*

- A. Be able to troubleshoot and repair the casualty himself if required \_\_\_\_\_
- B. Direct (manage) repair personnel \_\_\_\_\_
- C. Have an understanding of how the equipment failure affects the communications system \_\_\_\_\_





9. Do you feel that having a graduate from the NPS Information Systems (Telecommunications) Program under your supervision would (has) increase(d) the effectiveness of the operation of your command/department/division/ etc.? \*\*\*

- A. Yes, to a significant degree \_\_\_\_\_
- B. No, effectiveness of unit has decreased \_\_\_\_\_
- C. Unchanged, unit effectiveness has remained the same \_\_\_\_\_

10. Based on your response in question 9, in what way do you feel that the effectiveness would be (has been) altered?

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11. Based solely on your overall personal concept of the Communications Management (9310P) Subspecialty, you would expect an officer with this proficiency code to be:

- A. A manager/administrator with extensive technical knowledge \_\_\_\_\_
- B. A manager/administrator with some technical knowledge \_\_\_\_\_
- C. A manager/administrator with no technical knowledge \_\_\_\_\_
- D. Other (Please indicate) \_\_\_\_\_

12. Do you feel that the graduates of the NPS Information Systems (Telecommunications) Curriculum filling 9310P billets should require additional functional training in electronics (e.g., service schools)? \*\*\*

- A. No additional training required \_\_\_\_\_
- B. Informal on-the-job training sufficient \_\_\_\_\_



C. Additional functional training required \_\_\_\_\_

Please indicate;

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13. Do you feel that graduates of the NPS Information Systems (Telecommunications) Curriculum filling 9310P billets should require additional education in management (e.g., personnel, systems, or financial management)? \*\*\*

A. No additional education required \_\_\_\_\_

B. On-the-job experience sufficient \_\_\_\_\_

C. Additional formal education required \_\_\_\_\_  
Please indicate;

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14. In your estimation, would a newly assigned Information Systems (Telecommunications) graduate, because of his NPS education require less time to "settle in" to his billet and become fully effective in the performance of his duties than a non-graduate of the program? \*\*\*

A. Much less time required \_\_\_\_\_

B. Somewhat less time required \_\_\_\_\_

C. About the same as a non-graduate \_\_\_\_\_

D. Requires more time than a non-graduate \_\_\_\_\_



15. Is there any area of specialized functional training that could be provided that you feel would lessen this settling period? (Please indicate)

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16. To what extent should the Communications Manager (9310P) within your command be familiar with automated and/or computerized message processing systems? \*\*\*

- A. Be able to operate terminal equipment \_\_\_\_\_
- B. Understand overall system \_\_\_\_\_
- C. Both A and B above \_\_\_\_\_
- D. Not within the billet's area of responsibility \_\_\_\_\_

17. Based on the requirements of the 9310P billets within your command, the emphasis on automatic data processing (ADP) is directed toward: \*\*\*

- A. Programming (Software) \_\_\_\_\_
- B. Equipment operations (Hardware) \_\_\_\_\_
- C. Systems Management \_\_\_\_\_
- D. Systems Design \_\_\_\_\_
- E. Not applicable \_\_\_\_\_

18. Do you feel that the graduates of the Information Systems (Telecommunications) Curriculum filling the 9310P billets at your command require additional functional training in the Automatic Data Processing field? \*\*\*

- A. No additional functional training required \_\_\_\_\_
- B. Informal on-the-job training sufficient \_\_\_\_\_



- C. Additional functional training required \_\_\_\_\_  
Please indicate;

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19. Do you feel that the needs of the Naval Communications System could best be served by establishing a communications specialist program rather than subspecialists?

- A. Strictly specialist (e.g., Army Signal Corps) \_\_\_\_\_  
B. Strictly subspecialist (e.g., Current Navy System) \_\_\_\_\_  
C. Combination of both specialist and subspecialist \_\_\_\_\_  
D. Other (Please indicate) \_\_\_\_\_

20. Do you feel that the graduates from the NPS Information Systems (Telecommunications) Curriculum filling the 9310P billets at your command require additional education in Operations Research? (e.g., Message Queing Analysis, Message Network Analysis, and Equipment reliability)\*\*\*

- A. No additional education required \_\_\_\_\_  
B. Informal on-the-job experience is sufficient \_\_\_\_\_  
C. Additional education required \_\_\_\_\_  
Please indicate;

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- D. Not applicable to the job \_\_\_\_\_





21. Your knowledge of the Information Systems (Telecommunications)

Program at the Naval Postgraduate School is based on:

- A. Published literature describing the program \_\_\_\_\_
- B. Informal conversations with other officers \_\_\_\_\_
- C. Tour of duty as a student at the Naval Postgraduate School \_\_\_\_\_
- D. Service with graduates or students of the program \_\_\_\_\_
- E. No knowledge of the program \_\_\_\_\_

22. My present rank is \_\_\_\_\_

23. Number years of commissioned service I have completed:

- A. 5 - 9
- B. 10 - 14
- C. 15 - 20
- D. Greater than 20

24. My designator is \_\_\_\_\_

25. My subspecialty code (P-code) is \_\_\_\_\_

26. My source of commission is:

- A. Naval Academy
- B. NROTC-Regular
- C. NROTC-Contract
- D. OCS
- E. NESEP/OCS
- F. LDO/Warrant Program
- G. Other (Please indicate) \_\_\_\_\_

27. I have received the following degree(s) (e.g., BS Electronics Engineering) \_\_\_\_\_



28. Any additional candid comments concerning the previous questions or the Communications Management (9310P) subspecialty proficiency code would be greatly appreciated.

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Thank you for your time and effort.



## APPENDIX B

### EXPLANATION OF STATISTICAL METHODS

#### 1. Chi-square ( $x^2$ )

This test is designed to measure the difference between various sets of expected and actual data values. As differences between the expected and actual values increase the larger the Chi-square value becomes.

The Chi-square value is found by using the following formula:

$$x^2 = \sum_i^n \frac{(O_i - E_i)^2}{E_i}$$

where ' $O_i$ ' equals the observed value and ' $E_i$ ' equals the expected value.

The 'n' equals the number of cases involved.

To illustrate the above, in order to support the basic hypothesis in question four, the following values ( $E_i$ ) were estimated; a : 36, b : 0, c : 2, and d : 3. Applying the formula for Chi-square the result was = 54.01.

Since there were four cases involved three degrees of freedom (df) existed.<sup>17</sup> Now, referring to the table of critical values of Chi-square for  $P = .05$  at three degrees of freedom, we get a value of 7.82.<sup>18</sup> The Chi-square value computed is much greater than 7.82, signifying a great difference between expected and critical values. Questions four through

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<sup>17</sup>Siegel, S., Nonparametric Statistics for the Behavioral Science, p. 251, McGraw-Hill, 1956.

<sup>18</sup>Ibid, p. 251



twenty were handled in this manner. A portion of the table of critical values for Chi-square on which these tests were made follows:

Degrees of Freedom	Values for $\chi^2$ for specified numbers of degrees of freedom (P = .05)
1.	3.84
2.	5.99
3.	7.82
4.	9.49
5.	11.07
6.	12.59
7.	14.07

## 2. The Kolmogorov-Smirnov One-Sample Test (K-S)

The K-S Test is one concerning the degree of agreement between the distribution of a set of estimated values and a set of observed values. This test involved contrasting the cumulative frequencies of estimated and observed values. The point of greatest divergence (D) is located and compared with a value taken from the appropriate section of the critical values of D in the Kolmogorov-Smirnov one sample test.<sup>19</sup> The level of significance for D = maximum value  $[F_o(X) - S_n(X)]$  will be .05. Since all questions being tested by this method had a sample size (n) greater than 35, the probability associated with D ( $1.36/\sqrt{n}$ ) will be compared with .05. If it is less than or equal to .05 then the hypothesis will be rejected. For example, the K-S Test for question 6 would be as follows:

<sup>19</sup>Ibid, p. 251





	<u>A</u>	<u>B</u>	<u>C</u>
$f_o(X)$ cumulative estimated values	9	44	46
$S_3(X)$ cumulative observed values	<u>3</u>	<u>27</u>	<u>46</u>
$D = f_o(X) - S_3(X)$	<u>6</u> 46	<u>17</u> 46	<u>0</u> 46

$$n = 46 \text{ Maximum } D = \frac{17}{46} \text{ of } .3695 \text{ or } .370$$

Now;  $1.36/\sqrt{n} = 1.36/\sqrt{46} = 1.36/6.78 = .201$ . This would give a probability of less than .05 and so the hypothesis will be rejected.

### 3. Correlation Analysis

Correlation analysis provides the researcher with a single summary statistic describing the strength of association between two variables.<sup>20</sup> This strength of association is indicated by the correlation coefficient.

In the case of this study ordinal data was presented. This meant that the data presented was numeric but could only be arranged in increasing or decreasing order with no exact numerical separation between the data. With this type of data, the Kendall rank-order coefficient (tau) was used rather than the Spearman coefficient. This was because the number of categories that the variables could take was small and the possibility of ties was high. This correlation coefficient was defined as

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<sup>20</sup> Nie, N., Bent, D. H. and Hull, C. H., Statistical Package for the Social Sciences (SPSS), p. 143, McGraw-Hill, 1970.



being nonparametric because the coefficient did not depend upon a normal distribution or on the metric quality of interval scales.<sup>21</sup>

The manual computation of the Kendall rank-order coefficient (tau) was found to be an arduous process which the SPSS program would handle easily. The formula for determining tau is:

$$\tau = \frac{S}{\sqrt{1/2 N(N-1) - T_x} \sqrt{1/2 N(N-1) - T_y}}$$

S is computed by beginning with the first ranked observation on the first variable and counting the number of ranks on the second variable which are greater than the rank of that case on the second variable. Once this is done, the number of ranks below this observation which are smaller than its rank of the second variable are subtracted from the first quantity. When this procedure is repeated for all ranks. The sum of these remainders is equal to S.<sup>22</sup>

$T_x = 1/2 \sum (t-1)$  where t is the number of ties and x and y are the two variables being correlated.

The correlation coefficients determined seemed rather low, however, many were still significant due to the size of the sample. An extract from a table of values of the correlation coefficient for different levels of significance is presented for comparison with values determined in the study.<sup>23</sup>

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<sup>21</sup>Ibid, p. 153

<sup>22</sup>Ibid, p. 154

<sup>23</sup>Hartkemeier, H. P., Introduction to Applied Statistical Analysis, p. 375, Dickenson, 1968.



N	P = .05	P = .01
40	.3044	.3932
45	.2875	.3721
50	.2732	.3541
60	.2500	.3248



## APPENDIX C

### QUESTIONNAIRE DISTRIBUTION LIST

1. Naval Communication Station, Adak
2. U. S. Naval Communication Station, Diego Garcia
3. U. S. Naval Communication Station, Asmira
4. U. S. Naval Communication Station, Harold E. Holt
5. U. S. Naval Communication Station, Balboa
6. Naval Communication Station, Washington, D. C.
7. U. S. Naval Communication Station, Guam
8. U. S. Naval Communication Station, Iceland
9. Naval Communication Station, Key West
10. U. S. Naval Communication Station, Londonderry
11. U. S. Naval Communication Station, Italy
12. U. S. Naval Communication Station, Greece
13. Naval Communication Station, Norfolk
14. U. S. Naval Communication Station, Puerto Rico
15. U. S. Naval Communication Station, Spain
16. Naval Communication Station, San Diego
17. U. S. Naval Communication Station, Philippines
18. U. S. Naval Communication Station, Morocco
19. Naval Communication Station, San Francisco
20. Naval Communication Station, Honolulu
21. U. S. Naval Communication Station, Japan





22. U. S. Naval Communication Unit, London
23. U. S. Naval Communication Unit, New Zealand
24. Naval Radio Station (T), Cutler
25. U. S. Naval Communication Technical Group, Rio De Janeiro
26. Commander-in-Chief, Atlantic
27. Commander-in-Chief, Pacific
28. Commander-in-Chief, U. S. Atlantic Fleet
29. Commander-in-Chief, U. S. Pacific Fleet
30. Commander Amphibious Force, U. S. Atlantic Fleet
31. Commander Amphibious Force, U. S. Pacific Fleet
32. Commander U. S. Naval Forces, Japan
33. Commander South Atlantic Force
34. Commander Naval Air Force, U. S. Atlantic Fleet
35. Commander Naval Air Force, U. S. Pacific Fleet
36. Commander Middle East Force
37. Commander Cruiser-Destroyer Force, U. S. Atlantic Fleet
38. Commander Cruiser-Destroyer Force, U. S. Pacific Fleet
39. Commander Naval Telecommunications Command
40. Fleet Operations Control Center, U. S. Pacific Fleet
41. National Security Agency
42. Naval Security Group Command
43. Naval Officer Training Center, Newport, R.I.
44. Senior U. S. Naval Officer, U. S. DEL MC, NATO
45. Naval War College
46. U. S. Naval Support Force, Antarctica



47. Navy AUTODIN Switching Center, Albany
48. Commander-in-Chief, U. S. Naval Forces, Europe
49. Commander Second Fleet
50. Commander Third Fleet
51. Commander Sixth Fleet
52. Commander Seventh Fleet
53. Commander Carrier Group 1
54. Commander Carrier Group 2
55. Commander Carrier Group 3
56. Commander Carrier Group 4
57. Commander Carrier Group 5
58. Commander Carrier Group 6
59. Commander Carrier Group 7
60. Commander Cruiser-Destroyer Group 1
61. Commander Cruiser-Destroyer Group 2
62. Commander Cruiser-Destroyer Group 3
63. Commander Cruiser-Destroyer Group 5
64. Commander Cruiser-Destroyer Group 8
65. Commander Cruiser-Destroyer Group 12
66. Commander Amphibious Group 1
67. Commander Amphibious Group 2
68. USS AMERICA (CVA-66)
69. USS FORRESTALL (CVA-59)
70. USS INDEPENDENCE (CV-62)
71. USS JOHN F. KENNEDY (CVA-67)



- 72. USS FRANKLIN D. ROOSEVELT (CVA-42)
- 73. USS SARATOGA (CV-60)
- 74. USS LEXINGTON (CVT-16)
- 75. USS MOUNT WHITNEY (LCC-20)
- 76. USS BLUE RIDGE (LCC-19)
- 77. USS CONSTELLATION (CVA-64)
- 78. USS CORAL SEA (CVA-43)
- 79. USS ENTERPRISE (CVAN-65)
- 80. USS KITTY HAWK (CV-63)
- 81. USS ORISKANY (CVA-34)
- 82. USS RANGER (CV-60)
- 83. USS HANCOCK (CVA-19)
- 84. USS MIDWAY (CVA-42)
- 85. Curricular Officer, Information Systems (Telecommunications)  
Naval Postgraduate School  
Monterey, California



## APPENDIX D

### EXTRACTS OF COMMENTS FROM QUESTIONNAIRE

The following excerpts from comments made by respondents is representative of the type that greatly influenced the conclusions and recommendations of the thesis:

1. "Beyond a general understanding of the US Navy communications system and management principles, the Naval Postgraduate School graduate 9310-P would be no more effective than any other officer with no communications operating experience in shipboard communications."
2. "In my opinion I have no requirements for people with 9310-P designation. My requirements are for experienced communicators as well as well rounded officers."
3. "I would hate to have only Naval Postgraduate School graduates. Real world experience and demonstrated performance is the key."
4. "I believe 'on the job' communications experience is worth as much, at least as the same time in PG School."
5. "If graduate does not have operational communications experience, additional functional training in general communications procedures and equipment operation is highly desirable."
6. "I think a functional school that fills the gap between the Newport communications course and Monterey is needed."
7. "Not nearly enough emphasis placed on Navy operational communications either afloat or ashore."
8. "Previous communications officer experience on a CVA/CV which will include a high volume operation: i.e., sea type tempo."
9. "Monterey does not teach anyone to be a communicator."
10. "I feel graduates should have some COMSTA OJT as well as shipboard OJT preferably on a CVA or LCC type."





11. "All the 9310-P officers I know seem to have an excellent background in management per se, but with the exception of one LCDR with past experience as OPS officer aboard an LST, all seem to be fairly weak in basic communication procedures, techniques and shipboard equipment. This can be overcome in time, however the communications management curriculum needs to be expanded to include this or the school at Newport is a must."
12. "I do not feel that it is any great advantage to have graduated from Information Systems Program unless the textbooks exposure is fortified by on site experience."
13. "Major unit (afloat) communications center, communications station, technical control, anything that would provide insight into 'real world' communications problems."
14. "Based on very limited sample (only one grad) it took longer for this officer to settle in as compared to most line officers."
15. "I need people who understand communications systems, not components of systems."
16. "What my concept of the subspecialty is, and what the individual is may differ considerably...I need managers who have extensive technical knowledge. I doubt that many 9310-P fill the bill."
17. "He'd better have experience."
18. "The curriculum needs some effort placed on the DCS systems, message formats, ships systems, and communications required to support a task force at sea...frequency predictions."
19. "This is the fourth communications billet I have held (1 shipboard, 2 at OPNAV, and current billet). The two at OPNAV were P-coded. I have never been selected for PG School, even though I keep requesting that I get into the 620 curriculum. In the OPNAV billet I was the action officer for the sponsor of the 620 curriculum (OP-941). Have done pretty well in all these billets, so I'm beginning to think 620 is no panacea."
20. "With no prior communications experience, the 9310-P is completely unprepared to make knowledgeable decisions or recognize deficiencies."
21. "A communications officer would be far better prepared to carry out his responsibilities if emphasis in training was shifted from electronics to fleet communications procedures and overall systems."
22. "Recommend prior tour in communications as prerequisite for PG communications training."



23. "As the situation now stands, I wouldn't swap one good LDO for an entire class of PG School trained communicators who have no prior communications experience."

24. "Any good officer with advanced training will improve the organization."

25. "We need officers with formal training in conjunction with Navy tactical and DCS experience. All these elements are essential."

26. "Any time NPS grad with no prior-to-school experience is placed in 'experience required' job, grad will have initial difficulty."

27. "Need familiarization with the communications system routing methods, including NAVCOMPARS."



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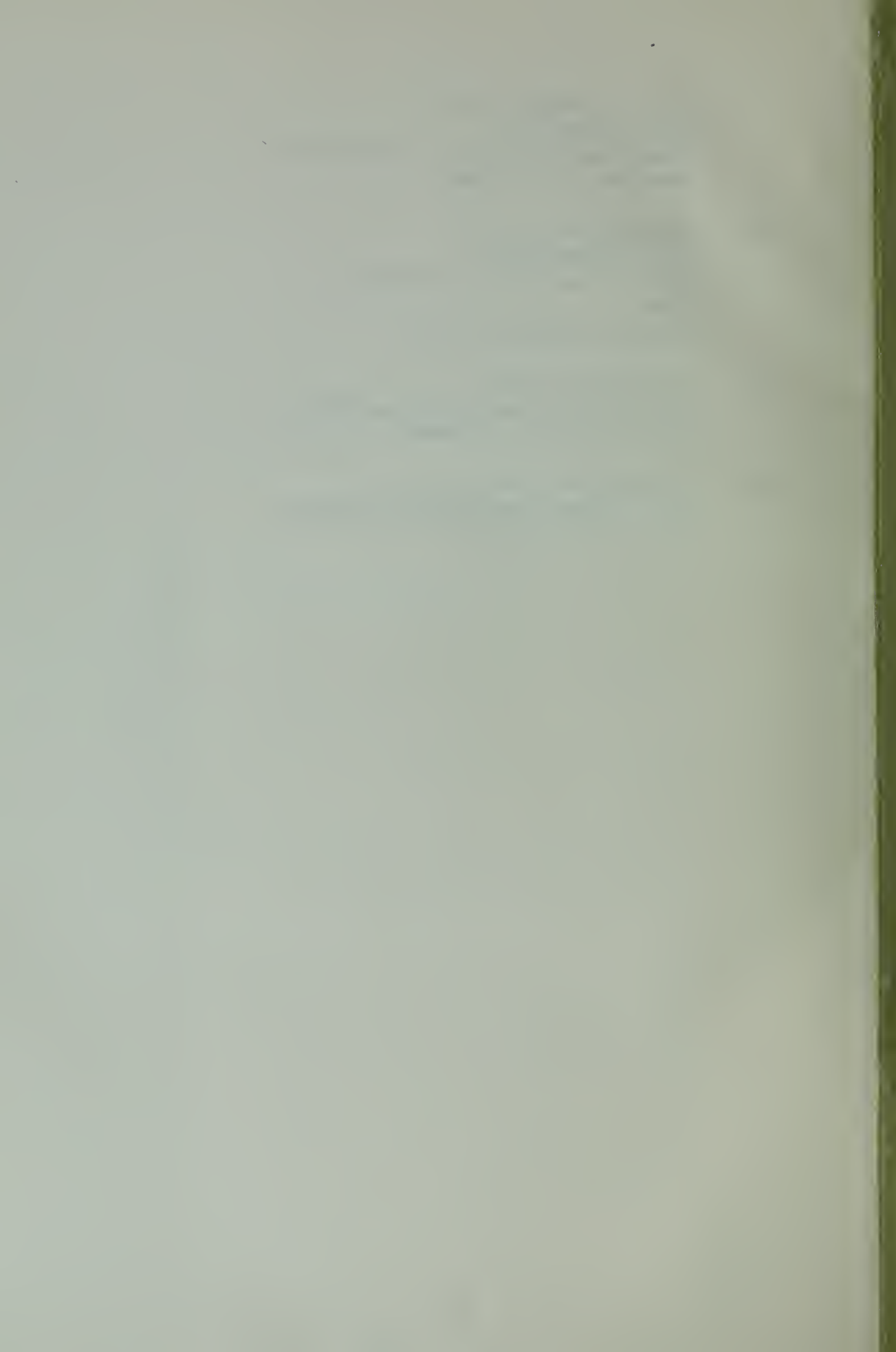
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